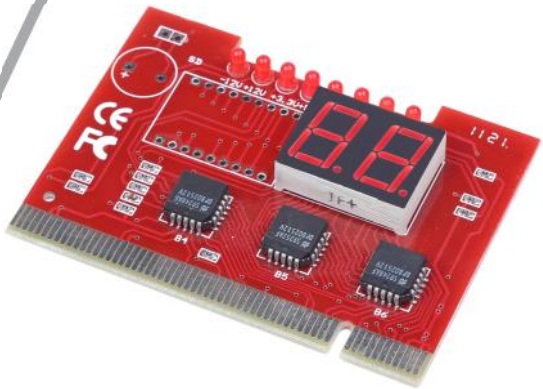
# CHM-002

USER MANUAL
HANDBUCH
HANDLEIDING
MANUEL DESCRIPTIF
РУКОВОДСТВО ПОЛЬЗОВАТЕЛЯ
КЕРІВНИЦТВО КОРИСТУВАЧА

GEMBIRD®



**COMPUTER HEALTH MONITOR PCI CARD**
**COMPUTER KONTROLLMONITOR FÜR DEN PCI-STECKPLATZ**
**DIAGNOSTISCHE PCI KAART**
**L'ORDINATEUR CONTRÔLE DE LA CARTE PCI**
**ДИАГНОСТИЧЕСКАЯ PCI-КАРТА ДЛЯ МАТЕРИНСКОЙ ПЛАТЫ КОМПЬЮТЕРА**
**ДІАГНОСТИЧНА PCI-КАРТА ДЛЯ МАТЕРИНСЬКОЇ ПЛАТИ КОМП'ЮТЕРА**

**Features**

- Designed for PCI slot of any motherboard
- Shows power supply unit status
- Indicates status of all interfaces and ports
- Error codes on the LED display help to pinpoint the assembly problems

**Specifications**

- BIOS version supported: PHOENIX v.4.01...6.0; AMI v.6.24; AWARD v.4.5
- Indicators: 8 color LEDs and 2-digit LED display
- PCI bus version supported: 3.3 V 32/64 bit
- Dimensions: 80 x 58 x 10.5 mm
- Net weight: 25 g

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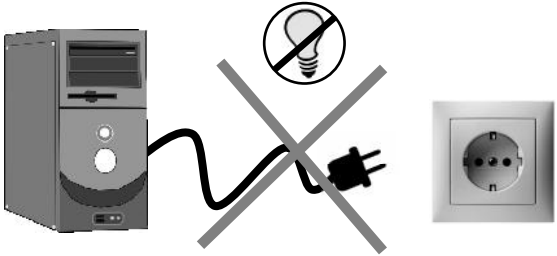

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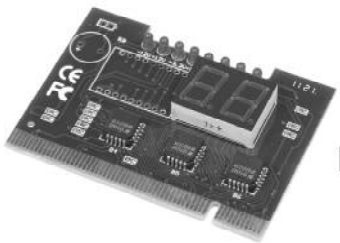

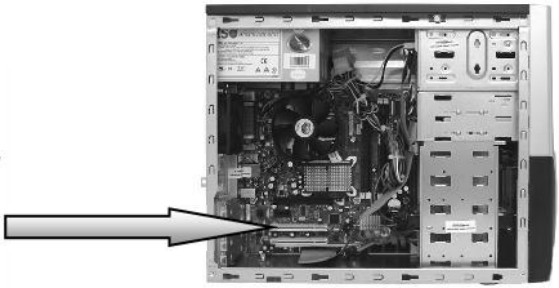

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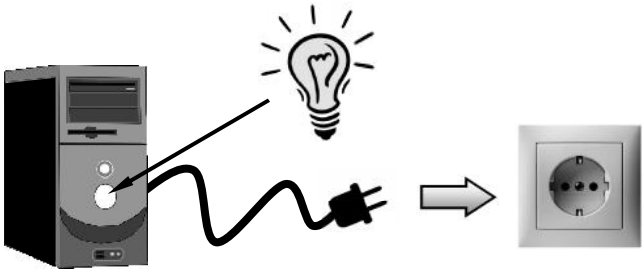


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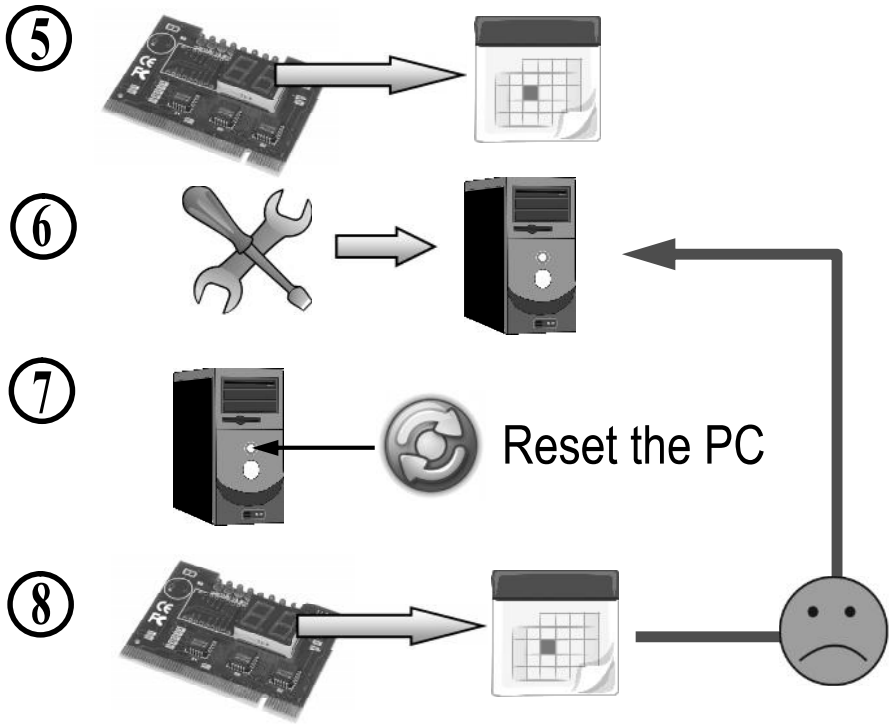



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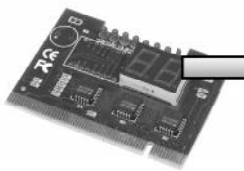

"00"
"FF"

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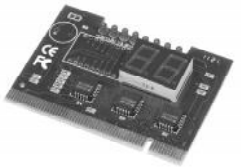

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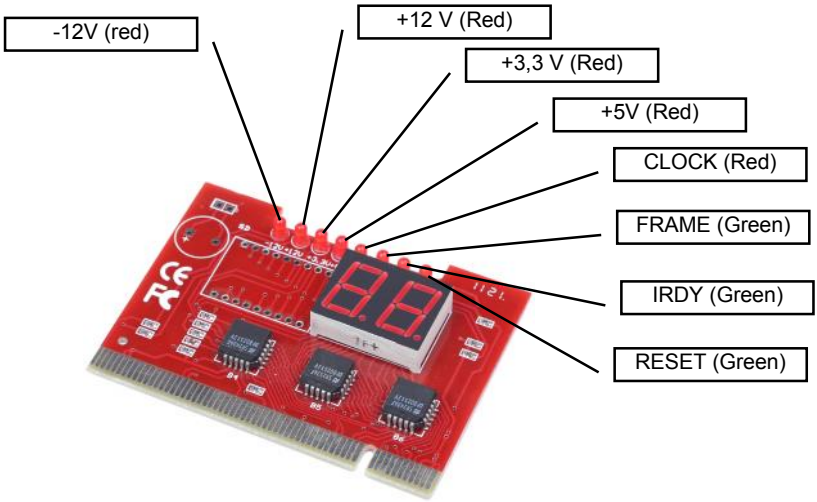
## Hexadecimal character table

| Hex | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Display | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | b | C | d | E | F |

## LEDs description





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## Table #1 - LEDs description

| LED | Color | Description |
|---|---|---|
| +5V | Red | Lit up whenever the motherboard is powered on with +5V voltage. If it is not lit up then it should be either the power supply fault or short circuit on the motherboard |
| -5V | Red | The same as "+5V" |
| +3.3V | Red | The same as "+5V". It is not lit up when the voltage 3.3V is not available on the motherboard |
| +12V | Red | The same as "+5V" |
| -12V | Red | The same as "+5V" |
| CLOCK | Red | CPU clock adjustment is without problems whenever this LED is lit up |
| FRAME | Red | Flashing whenever PCI "FRAME" signal is active |
| IRDY | Red | Flashing whenever PCI "IRDY" signal is active |
| RESET | Red | This LED should be lit up only during the reset.<br>If it is lit up all the time, then check the reset jumper.<br>This can also indicate that the reset circuit is defective |
| BIOS | Red | LED that turn on and off when the board powered on, as CPU is reading to BIOS |
| OSC | Red | Lights when the boardis powered on, or else the crystal oscillation circuit is broken and has no OSC message |


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## Table #2 - Error codes description

| Code | Award BIOS | AMI BIOS | Phoenix4.0/Tandy3000 BIOS |
|---|---|---|---|
| 00 | | Code copying to specific areas is done. Passing control to INT 19h boot loader next. | |
| 01 | Test the following processor status flags: carry, zero, sign, overflow | | CPU is testing the internal registers. CPU replacement is required if this error code is displayed |
| | The BIOS sets each flag, verifies they are set, then turns each flag off and verifies it is off | | |
| 02 | Test all CPU internal registers except SS,SP,and BP with data FF and 00 | | Verification of the real mode |
| 03 | Disable NMI,PIE,AIE, UEI, SQWV | Disable NMI, PIE, AIE, UEI, SQWV. NMI (Nonmaskable Interrupts) is disabled. Then check whether it is the soft reset or power-on | Disable Nonmaskable interrupts (NMI) |
| | Disable video, parity checking, DMA | | |
| | Reset math co-processor | | |
| | Clear all page registers, CMOS shutdown byte | | |


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| | Initialize timer 0,1, and 2, including set EISA timer to a known state | | |
| | Initialize DMA controllers 0 and1 | | |
| | Initialize interrupt controllers 0 and 1 | | |
| | Initialize EISA extended registers | | |
| **04** | RAM must be periodically refreshed to keep the memory from decaying. This refresh function is working properly | | Get CPU type |
| **05** | Keyboard controller Initialization | The BIOS stack has been built. Disable the cache memory | DMA initialization in progress or failure |
| **06** | Reserved | Uncompress the POST code | Initialize system hardware |
| **07** | Verifies CMOS is working correctly, detects bad battery | Initialize CPU and CPU data area | Disable shadow and execute code from the ROM |
| **08** | Primary chipset initialization | CMOS checksum calculation | Initialize chipset with initial POST values |
| | Memory presence test | | |
| | OEM chipset routines | | |
| | Clear low 64K memory | | |


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| | Test first 64K memory | | |
| **09** | Cyrix CPU initialization | | Set IN POST flag |
| | Cache initialization | | |
| **0A** | Initialize first 120 interrupt vectors with SPURIOUS-INT-HDLR and initialize INT 00h-1Fh according to INT-TBL | CMOS checksum calculation is done. Initialize CMOS status register with date and time | Initialize CPU registers |
| **0B** | Test CMOS RAM checksum, if it is wrong or INS key pressed, then load defaults | The CMOS status register is initialized. Perform the required initialization before the keyboard BAT command is issued | Enable CPU cache |
| **OC** | Detect type of keyboard controller and set NUMLOCK status | The keyboard controller input buffer is free. Issue BAT command to the keyboard controller | Initialize cache to the initial POST values |
| **0D** | Detect CPU clock | | |
| | Read CMOS location 14h to find out type of video in use | | |
| | Detect and initialize video adapter | | |
| **0E** | Test video memory, display sign-on message | The keyboard controller BAT command result has been verified. | Initialize I/O component |
| | Setup shadow RAM. Enable shadow according to setup | | |
| **0F** | Test DMA controller 0; BIOS checksum test | Initialization after BAT command test is done. Keyboard command is issued | Initialize the local bus IDE |


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| | Keyboard detection and initialization | | |
| **10** | Test DMA controller 1 | Test DMA. The keyboard controller command byte is written. Issue Pin 23 and 24 blocking and unblocking command | Initialize power management |
| **11** | Test DMA page registers | Check if <End> or <Ins> keys were pressed during the power-on. Initialize CMOS RAM if the corresponding option was set in BIOS or the <End> key was pressed | Load alternate registers with initial POST values |
| **12** | Reserved | Disable DMA controllers 1 and 2 and interrupt controllers 1 and 2 | Restore CPU control word during the warm boot |
| **13** | Reserved | The video display has been disabled. Port B has been initialized. Initialize the chipset | Initialize PCI bus mastering devices |
| **14** | Test 8254 Timer 0 Counter 2 | 8254 timer test | Initialize keyboard controller |
| **15** | Verify 8259 channel 1 interrupts by turning off and on the interrupt lines | | |
| **16** | Verify 8259 channel 2 interrupts by turning off and on the interrupt lines | | BIOS ROM checksum |
| **17** | Turn off interrupts, then verify that the Nonmaskable Interrupt register is on | | Initialize cache before memory auto size |
| **18** | Force an interrupt and verify that the interrupt really occurred | | 8254 timer initialization |
| **19** | Test stuck NMI bits. Verify NMI can be cleared | | The 8254 timer test is over. Start the memory refresh test |


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| **1A** | Display CPU clock | Toggle the memory refresh line. Check 15 seconds on/off time | 8237 DMA controller initialization |
| **1B** | Reserved | | |
| **1C** | Reserved | | Reset programmable interrupt controller |
| **1D,1E** | Reserved | | |
| **1F** | If EISA non-volatile memory checksum is ok, then execute EISA initialization. If not, execute ISA tests and clear EISA mode flag | | |
| | Test EISA configuration memory integrity(checksum & communication interface) | | |
| **20** | Initialize Slot 0(System board) | | Test DRAM refresh |
| **21** | Initialize Slot 1 | | |
| **22** | Initialize Slot 2 | | Test 8742 keyboard controller |
| **23** | Initialize Slot 3 | Read 8042 input port and disable the MEGAKEY Green PC feature. Make the BIOS code segment writable and perform the required configuration before initializing the interrupt vectors | |


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| **24** | Initialize Slot 4 | The configuration required before interrupt vector initialization has been completed. Interrupt vector initialization is about to begin | Set ES segment register to 4GB |
| **25** | Initialize Slot 5 | Interrupt vector initialization is done. Clear the password if the POST DIAG option is on | |
| **26** | Test the protected mode, check CPU and motherboard internal memory. If any non-fatal errors occurred then display error messages, otherwise just boot the operating system. This is the final code | Read/write input/output port of 8042 keyboard; ready for revolve mode, continue to get ready for initialization of all data, check 8042 chips on motherboard. See also AWARD BIOS | Enable A20 address line. Check A20 pins of memory controlling chips and the corresponding circuit. See also AWARD BIOS |
| **27** | Initialize Slot 7 | Any initialization required before setting the video mode will be done next | |
| **28** | Initialize Slot 8 | Initialization before setting the video mode has been completed. Set the monochrome and color mode | Auto size DRAM |
| **29** | Initialize Slot 9 | | Initialize POST memory manager |
| **2A** | Initialize Slot 10 | Initialize the different bus system, static, and output devices, if present | Clear 512KB base RAM |
| **2B** | Initialize Slot 11 | Pass control to the video ROM to perform any required configuration before the video ROM test | |
| **2C** | Initialize Slot 12 | All necessary processing before passing control to the video ROM is done. Look for the video ROM and pass control to it | RAM failure on address line XXXX* |


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| **2D** | Initialize Slot 13 | The video ROM has returned control to BIOS POST. Performing any required processing after the video ROM had control | |
| **2E** | Initialize Slot 14 | Completed testing of the video ROM. If EGA/VGA controller is not found, perform display memory read/write test next | RAM failure on data bits XXXX* of low byte of memory bus |
| **2F** | Initialize Slot 15 | EGA/VGA controller was not found. Display memory read/write test is about to start | Enable cache before system BIOS shadow |
| **30** | Size base memory from 256K to 640K and extended memory above 1MB | The display memory read/write test passed. Prepare retrace checking | |
| **31** | Test base memory from 256K to 640K and extended memory above 1MB | The display memory read/write test or retrace check are failed. Perform the alternate display memory read/write test next | |
| **32** | In EISA mode test EISA memory found in the initialization slots | The alternate display memory read/write test passed. Prepare alternate display retrace checking | Test CPU bus clock frequency |
| **33** | Reserved | | Initialize Phoenix dispatch manager |
| **34** | Reserved | Video display check is over. Set the display mode | |
| **35** | Reserved | | |
| **36** | Reserved | | Warm start and shut down |


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| **37** | Reserved | Display mode is set. Display the power on message | |
| **38** | Reserved | Initialize the bus input, IPL, general devices, if present | Shadow system BIOS ROM |
| **39** | Reserved | Display bus initialization error messages | |
| **3A** | Reserved | The new cursor position has been read and saved. Displaying the Hit <DEL> message next | Auto size cache |
| **3B** | Reserved | The Hit <DEL> message is displayed. The protected mode memory test is about to start | |
| **3C** | Setup enabled | | Advanced configuration of chipset registers |
| **3D** | Detect if mouse is present, initialize mouse, install interrupt vectors | | Load alternate registers with CMOS values |
| **3E** | Initialize cache controller | | |
| **3F** | Reserved | | |
| **40** | Display virus protection disable or enable option | Prepare the descriptor tables next | |
| **41** | Initialize floppy disk drive controller | | Initialize extended memory for RomPilot |
| **42** | Initialize hard drive controller | The descriptor tables are prepared. Enter protected mode for the memory test | Initialize interrupt vectors |


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| **43** | Detect and initialize serial & parallel ports and game port | Entered into protected mode. Enable interrupts for diagnostics mode | |
| **44** | Reserved | Interrupt enabled if the diagnostics option is set. Initialize data to check memory wraparound at 0:0 next | |
| **45** | Detect and initialize math coprocessor | Data initialized. Check memory wraparound at 0:0 and find the total system memory size next | POST device initialization |
| **46** | Reserved | The memory wraparound test is done. Memory size calculation has been done. Writing patterns to test memory | Check ROM copyright notice |
| **47** | Reserved | The memory pattern has been written to extended memory. Writing patterns to the base 640KB memory | Initialize 120 support |
| **48** | Reserved | Patterns written in the base memory. Determine the size of memory below 1 MB | Check video configuration against CMOS |
| **49** | Reserved | The memory size below 1MB has been found and verified. Determine the size of memory above 1MB | Initialize PCI bus and devices |
| **4A** | Reserved | | Initialize all video adapters |
| **4B** | Reserved | The memory size above 1 MB has been found and verified. Check soft reset and clear the memory below 1 MB for the soft reset. If this is a power on situation, go to checkpoint 4E | Quiet boot start (optional) |


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| **4C** | Reserved | The memory below 1MB has been cleared via a soft reset. Clear the memory above 1MB | Shadow video BIOS ROM |
| **4D** | Reserved | The memory above 1MB has been cleared via a soft reset. Save the memory size. Go to checkpoint 52 | |
| **4E** | Reboot under manufacturing mode. Otherwise display messages and enter setup | The memory test is started but not as the result of a soft reset. Display the first 64KB memory size | Display BIOS copyright notice |
| **4F** | Ask security password (optional) | The memory size has been displayed. Perform the sequential and random memory test | Initialize multi-boot |
| **50** | Write all CMOS values back to RAM and clear | The memory below 1MB has been tested and initialized. Adjusting the displayed memory size for relocation and shadowing | Display CPU type and speed |
| **51** | Enable parity checker, enable NMI, enable cache before boot | The memory size display has been adjusted for relocation and shadowing. Test the memory above 1MB | Initialize EISA board |
| **52** | Initialize option ROMs from C8000h to EFFFFh (or if FS can enabled then to F7FFFh) | The memory above 1MB has been tested and initialized. Save the memory size information | Test keyboard |
| **53** | Initialize time value in 0000:0040h BIOS area | The memory size information and the CPU registers are saved. Enter real mode | |
| **54** | | Shutdown has been successful. CPU is in the real mode. Disable the gate A20 line, parity, and the NMI | Set key click if enabled |
| **55** | | | Enable USB devices |


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| **57** | | The A20 address line, parity, and the NMI are disabled. Adjust the memory size depending on relocation and shadowing | |
| **58** | | The memory size has been adjusted for relocation and shadowing. Remove the Hit <DEL> message from the screen | Test for unexpected interrupts |
| **59** | | The Hit <DEL> message has been removed. The <WAIT…> message is displayed. Start the DMA and interrupt controller test | Initialize POST display service |
| **5A** | | | Display prompt: "Press F2 to enter SETUP" |
| **5B** | | | Disable CPU cache |
| **5C** | | | Test RAM between 512 and 640KB |
| **60** | Setup virus protection (boot sector protection) functionality according to the setup setting | The DMA page register test passed. Perform the DMA controller 1 base register test | Test extended memory |
| **61** | Try to turn on level 2 cache (if L2 cache is already turned on in post 3D, then this part will be skipped) | | |
| | Set the boot up speed according to setup setting | | |
| | Last chance for chipset initialization | | |
| | Last chance for power management initialization (Green BIOS only) | | |


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| | Show the system configuration table | | |
| **62** | Setup NUMLOCK status according to setup values | DMA controller 1 base register test passed. Perform the DMA controller 2 base register test | Test extended memory address lines |
| | Program the NUMLOCK, typematic rate & typematic speed according to setup setting | | |
| **63** | If there are any changes in the hardware configuration, update ESCD information (PnP BIOS only) | | |
| | Clear memory that has been used | | |
| | Boot system via INT 19h | | |
| **64** | | | Jump to UserPatch1 |
| **65** | | The DMA controller 2 base register test passed. Program DMA controllers 1 and 2 | |
| **66** | | Completed programming DMA controllers 1 and 2. Initialize 8259 interrupt controller | Configure advanced cache registers |
| **67** | | Completed 8259 interrupt controller initialization | Initialize muti-processor APIC |
| **68** | | | Enable external and CPU caches |


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| **69** | | | Setup system management mode (SMM) area |
| **6A** | | | Display external L2 cache size |
| **6B** | | | Load custom defaults (optional) |
| **6C** | | | Display shadow area message |
| **6E** | | | Display possible high address for UMB recovery |
| **70** | | | Display error message |
| **72** | | | Check for configuration errors |
| **76** | | | Check for keyboard errors |
| **7C** | | | Setup hardware interrupt vectors |
| **7D** | | | Initialize intelligent system monitoring |
| **7E** | | | Initialize coprocessor if present |
| **7F** | | Extended NMI source enabling is in progress | |
| **80** | | The keyboard test has been started. Clear the output buffer and check for stuck keys. Issue the keyboard reset command | Disable onboard super I/O ports and IRQs |


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| **81** | | A keyboard reset error or stuck key was found. Issue the keyboard controller interface test command | Late POST device initialization |
| **82** | | The keyboard controller interface test has been completed. Write the command byte and initialize the circular buffer | Detect and install external RS232 ports |
| **83** | | The command byte has been written and global data initialization has been completed. Check for a locked key | Configure non-MCD IDE controllers |
| **84** | | Locked key checking is over. Check for a memory size mismatch with CMOS RAM data | Detect and install external parallel ports |
| **85** | | The memory size check is done. Display any non-fatal error and check for a password or bypass WINBIOS setup | Initialize PC-compatible PnP ISA devices |
| **86** | | The password has been checked. Perform any required programming before WINBIOS setup | Re-initialize onboard I/O ports |
| **87** | | The programming before WINBIOS setup has been completed. Uncompress the WINBIOS setup code and execute AMIBIOS setup or WINBIOS setup utility | Configure motherboard configurable devices (optional) |
| **88** | | Return from WINBIOS setup and clear the screen. Perform any necessary programming after WINBIOS setup | Initialize BIOS data area |


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| **89** | | The programming after WINBIOS setup has been completed. Display the power on screen message | Enable Nonmaskable Interrupts (NMIs) |
| **8A** | | | Initialize extended BIOS data area |
| **8B** | | The first screen message has been displayed. The <WAIT…> message is displayed. Perform PS/2 mouse check and extended BIOS data area allocation check | Test and initialize PS/2 mouse |
| **8C** | | Program the WINBIOS setup options | Initialize floppy controller |
| **8D** | | The WINBIOS setup options are programmed. Reset the hard disk controller | |
| **8E** | | The hard disk controller has been reset. Configure the floppy drive controller | |
| **8F** | | | Determine number of ATA drivers (optional) |
| **90** | | | Initialize hard disk controllers |
| **91** | | The floppy drive controller has been configured. Configure the hard disk drive controller | Initialize local bus hard disk controllers |
| **92** | | | Jump to UserPatch2 |
| **93** | | | Build MPTABLE for muti-processor boards |


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| **95** | | Initialize bus adaptor ROMs from C8000h to D8000h | Install CD-ROM for boot |
| **96** | | Initialization before passing control to the adaptor ROM atC800h | Clear huge ES segment register |
| **97** | | Initialization before the C800h adaptor ROM gains control has been completed. The adaptor ROM check | Fix up multi-processor table |
| **98** | | The adaptor ROM has now returned control to BIOS POST | Search for optional ROMs. One long, two short beeps on checksum failure |
| **99** | | Perform the required initialization after the optional ROM test has been completed. Configure the timer data area and printer base address | Check for SMART drive (optional) |
| **9A** | | Set the timer and printer base addresses. Set the RS-232 base address | Shadow option ROMs |
| **9B** | | The setting of RS-232 base address has been completed. Perform the required initialization before the coprocessor test | |
| **9C** | | The initialization before the coprocessor test is over. Initialize the coprocessor test | Setup power management |
| **9D** | | Coprocessor initialized. Perform the required initialization after the coprocessor test | Initialize security engine (optional) |


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| **9E** | | Initialization after the coprocessor test has been completed. Check the extended keyboard, keyboard ID, and NUMLOCK keys. Issue the keyboard ID command | Enable hardware interrupts |
| **9F** | | | Determine number of ATA and SCSI drives |
| **AO** | | | Set time of day |
| **Al** | | | Check key lock |
| **A2** | | Display any non-fatal error | |
| **A3** | | The non-fatal error display has been completed. Set the keyboard typematic rate | |
| **A4** | | The keyboard typematic rate is set. Program the memory wait states | Initialize typematic rate |
| **A5** | | Memory wait state programming is over. Clear the screen and enable parity and the NMI | |
| **A7** | | NMI and parity are enabled. Perform the required initialization before passing control to the adaptor ROM at E000 | |
| **A8** | | Initialization before passing control to the adaptor ROM at E000h is completed. Pass control to the adaptor ROM at E000h | Remove the F2 prompt from the screen |


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| **A9** | | Return control from adaptor ROM at E000H. Performing the required initialization | |
| **AA** | | Initialization has been completed. Display the system configuration | Scan for F2 key stroke |
| **AB** | | Uncompress the DMI data and execute DMI POST initialization | |
| **AC** | | | Enter SETUP |
| **AE** | | | Clear boot flag |
| **BO** | Interrupt occurs in protected mode | The system configuration is displayed | Check for errors |
| **B1** | If NMI occurs, then display: "Press F1 to disable NMI, F2 reboot" | | Inform RomPilot about the end of POST |
| **B2** | | | POST done-prepare to boot operating system |
| **B4** | | | One short beep before boot |
| **B5** | | | Terminate quiet boot (optional) |
| **B6** | | | Check password (optional) |
| **B7** | | | Initialize ACPI BIOS |


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|---|---|---|---|
| **B9** | | | Prepare boot |
| **BA** | | | Initialize SMBIOS |
| **BB** | | | Initialize PnP option ROMs |
| **BC** | | | Clear parity checkers |
| **BD** | | | Display multi-boot menu |
| **BE** | Program chipset registers with power-on BIOS defaults | | Clear screen (optional) |
| **BF** | Program the rest of the chipset's registers according to the setup values | | Check virus and backup reminders |
| | If auto configuration is enabled, program the chipset with the predefined values from the MODBIN.exe auto table | | |
| **CO** | Turn OEM specific cache shadow off | | Try to boot with INT 19 |
| | Initialize standard devices with default values: DMA controller (8237); Programmable interrupt controller (8259); Programmable interval timer (8254); RTC chip | | |
| **C1** | OEM specific-Test to determine the size of on-board memory | | Initialize POST Error Manager (PEM) |
| **C2** | | | Initialize error logging |


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| | | | |
|---|---|---|---|
| **C3** | Test the first 256K DRAM. Expand the compressed codes into temporary DRAM area including the compressed system BIOS & Option ROMs | | Initialize error display function |
| **C4** | | | Initialize system error handler |
| **C5** | OEM specific-Early shadow enable for fast boot | | PnP dual CMOS (optional) |
| **C6** | External cache size detection | | Initialize note dock (optional) |
| **C7** | | | Initialize note dock (continued) |
| **C8** | | | Force check (optional) |
| **C9** | | | Extended checksum (optional) |
| **CA** | | | Redirect INT 15h to enable remote keyboard |
| **CB** | | | Redirect INT 13h to memory devices such as ROM, AM, PCMCIA, and serial disk |
| **CC** | | | Redirect INT 10h to enable remote serial video |
| **CD** | | | Re-map I/O and memory for PCMCIA |
| **CE** | | | Initialize digitizer and display message |


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| | | | |
|---|---|---|---|
| **D0** | | The NMI is disabled. Power-on delay starts. Verification of the initialization code checksum | |
| **D1** | | Initialize the DMA controller, perform the keyboard controller BAT test, start memory refresh, enter 4GB flat mode | |
| **D2** | | | Unknown interrupt |
| **D3** | | Start memory sizing | |
| **D4** | | Return to real mode. Execute any OEM patches and set up the stack next | |
| **D5** | | Pass control to the uncompressed code in shadow RAM at E000:0h. The initialization code is copied to segment 0 and control will be transferred to segment 0 | |
| **D6** | | Control is in segment 0. Check if <Ctrl><Home> was pressed and verify the system BIOS checksum. If either <Ctrl><Home>was pressed or the system BIOS checksum is bad, then go to checkpoint code E0. Otherwise go to checkpoint code D7 | |
| **E0** | | The onboard floppy controller (if available) is initialized. Start the base 512KB memory test | Initialize the chipset |
| **E1** | E1 setup-Page E1 | Initialize the interrupt vector table | Initialize the bridge |


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| | | | |
|---|---|---|---|
| **E2** | E2 setup-Page E2 | Initialize DMA and interrupt controllers | Initialize the CPU |
| **E3** | E3 setup-Page E3 | | Initialize system timer |
| **E4** | E4 setup-Page E4 | | Initialize system I/O |
| **E5** | E5 setup-Page E5 | | Check force recovery boot |
| **E6** | E6 setup-Page E6 | Enable the floppy drive controller and Timer IRQs. Enable internal cache memory | Checksum BIOS ROM |
| **E7** | E7 setup-Page E7 | | Go to BIOS |
| **E8** | E8 setup-Page E8 | | Set huge segment |
| **E9** | E9 setup-Page E9 | | Initialize multi-processor |
| **EA** | EA setup-Page EA | | Initialize OEM special code |
| **EB** | EB setup-Page EB | | Initialize PIC and DMA |
| **EC** | EC setup-Page EC | | Initialize memory type |
| **ED** | ED setup-Page ED | Initialize the floppy drive | Initialize memory size |
| **EE** | EE setup-Page EE | Look for a floppy diskette in drive A:. Read the first sector of the diskette | Shadow boot block |


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| | | | |
|---|---|---|---|
| **EF** | EF setup-Page EF | A read error occurred while reading the floppy drive in drive A: | System memory test |
| **F0** | | Search for AMIBOOT.ROM file in the root directory | Initialize interrupt vectors |
| **F1** | | AMIBOOT.ROM file is not in the root directory | Initialize Real Time Clock |
| **F2** | | Read and analyze the floppy diskette FAT to find the clusters occupied by file AMIBOOT.ROM | Initialize video |
| **F3** | | Read AMIBOOT.ROM file, cluster by cluster | Initialize System Management Manager |
| **F4** | | AMIBOOT.ROM file has wrong size | Produce one beep |
| **F5** | | Disable internal cache memory. | Clear huge segment |
| **F6** | | | Boot to Mini DOS |
| **F7** | | | Boot to Full DOS |
| **FB** | | Detect the type of flash ROM | |
| **FC** | | Erase the flash ROM | |
| **FD** | | Program the flash ROM | |
| **FF** | INT 19H boot attempt. The motherboar has been tested to be ok | Flash ROM programming has been successful. Restart the system BIOS | |


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## Table #3 - Buzzer beep codes description

- **AMI BIOS beep codes (fatal errors)**

| Beep code | Description |
|---|---|
| 1 beep | DRAM failed |
| 2 beeps | Parity check error in the first 64K DRAM |
| 3 beeps | Basic 64K RAM defective |
| 4 beeps | System timer failure |
| 5 beeps | Processor failure |
| 6 beeps | Keyboard controller gate circuit A20 failure |
| 7 beeps | Processor virtual mode exception occurs |
| 8 beeps | Display memory read/write test failure |
| 9 beeps | ROM BIOS checksum (32KB at F800:0) failed |
| 10 beeps | CMOS shutdown register read/write error |
| 11 beeps | Cache memory error |

- **AMI BIOS beep codes (non-fatal errors)**

| Beep code | Description |
|---|---|
| 2 short | POST failure - some hardware tests failed |
| 1 long 2 short | An error in the video BIOS ROM or a horizontal retrace failure |
| 1 long 3 short | Conventional/Extended memory failure |
| 1 long 8 short | Display/Retrace test failed |


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- **AWARD BIOS beep codes**

| Beep code | Description |
|---|---|
| 1 short | System is normal |
| 2 short | Any non-fatal error, enter BIOS SETUP |
| 1 long 1 short | RAM or the motherboard error |
| 1 long 2 short | Video Error, cannot initialize screen to display any information |
| 1 long 3 short | Keyboard controller error |
| 1 long 9 short | Flash RAM/EPROM error (BIOS IC error) |
| Long beep | Memory bank is not plugged well or broken |

- **PHOENIX BIOS beep codes**

| Beep code | Description |
|---|---|
| 1-1-1-3 | Verify real mode |
| 1-1-2-1 | Get CPU type |
| 1-1-2-3 | Initialize system hardware |
| 1-1-3-1 | Initialize chipset registers with initial POST values |
| 1-1-3-2 | Set in POST flag |
| 1-1-3-3 | Initialize CPU registers |
| 1-1-4-1 | Initialize cache to initial POST values |
| 1-1-4-3 | Initialize I/O |
| 1-2-1-1 | Initialize power management |
| 1-2-1-2 | Load alternate registers with initial POST values |
| 1-2-1-3 | Jump to UserPatch0 |
| 1-2-2-1 | Initialize keyboard controller |
| 1-2-2-3 | BIOS ROM checksum |


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| | |
|---|---|
| 1-2-3-1 | 8254 timer initialization |
| 1-2-3-3 | 8237 DMA controller initialization |
| 1-2-4-1 | Reset programmable interrupt controller |
| 1-3-1-1 | Test DRAM refresh |
| 1-3-1-3 | Test 8742 keyboard controller |
| 1-3-2-1 | Set ES segment to register to 4GB |
| 1-3-3-1 | Auto check size of DRAM |
| 1-3-3-3 | Clear 512K base DRAM |
| 1-3-4-1 | Test 512K base address lines |
| 1-3-4-3 | Test 512Kbase memory |
| 1-4-1-3 | Test CPU bus-clock frequency |
| 1-4-2-4 | Re-initialize the chipset |
| 1-4-3-1 | Shadow system BIOS ROM |
| 1-4-3-2 | Re-initialize the cache |
| 1-4-3-3 | Auto check size of cache |
| 1-4-4-1 | Configure advanced chipset registers |
| 1-4-4-2 | Load alternate registers with CMOS values |
| 2-1-1-1 | Set initial CPU speed |
| 2-1-1-3 | Initialize interrupt vectors |
| 2-1-2-1 | Initialize BIOS interrupts |
| 2-1-2-3 | Check ROM copyright notice |
| 2-1-2-4 | Initialize manager for PCI Options ROMs |
| 2-1-3-1 | Check video configuration against CMOS |
| 2-1-3-2 | Initialize PCI bus and device |
| 2-1-3-3 | Initialize all video adapters in system |
| 2-1-4-1 | Shadow video BIOS ROM |
| 2-1-4-3 | Display copyright notice |
| 2-2-1-1 | Display CPU type and speed |
| 2-2-1-3 | Test keyboard |
| 2-2-2-1 | Set key click if enabled |
| 2-2-2-3 | Enable keyboard |
| 2-2-3-1 | Test unexpected interrupts |


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| | |
|---|---|
| 2-2-3-3 | Display prompt "Press F2 to enter SETUP" |
| 2-2-4-1 | Test RAM between 512K and 640K |
| 2-3-1-1 | Test expanded memory |
| 2-3-1-3 | Test extended memory address lines |
| 2-3-2-1 | Jump to UserPatch1 |
| 2-3-2-3 | Configure advanced cache registers |
| 2-3-3-1 | Enable external and CPU caches |
| 2-3-3-3 | Display external cache size |
| 2-3-4-1 | Display shadow message |
| 2-3-4-3 | Display non-disposable segments |
| 2-4-1-1 | Display error messages |
| 2-4-1-3 | Check for configuration errors |
| 2-4-2-1 | Test real-time-clock(RTC) |
| 2-4-2-3 | Check for keyboard errors |
| 2-4-4-1 | Set up hardware interrupt vectors |
| 2-4-4-3 | Test coprocessor if present |
| 3-1-1-1 | Disable onboard I/O ports |
| 3-1-1-3 | Detect and install external RS232 ports |
| 3-1-2-1 | Detect and install external parallel ports |
| 3-1-2-3 | Re-initialize onboard I/O ports |
| 3-1-3-1 | Initialize BIOS data area |
| 3-1-3-3 | Initialize extended BIOS data area |
| 3-1-4-1 | Initialize floppy controller |
| 3-2-1-1 | Initialize hard-disk controller |
| 3-2-1-2 | Initialize local-bus hard-disk controller |
| 3-2-1-3 | Jump to UserPatch2 |
| 3-2-2-1 | Disable A20 address line |
| 3-2-2-3 | Clear huge ES segment register |
| 3-2-3-1 | Search for optional ROMs |


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### Table #4 – How to enter the BIOS Setup

| BIOS type | Key | Prompt |
|---|---|---|
| AMI | <Del> or <Esc> | Displayed |
| Award | <Del> or <Ctrl><Alt><Esc> | Displayed |
| MR | <Del>or<Ctrl><Alt><Esc> | None |
| COMPAQ | Press <F10> when the cursor is displayed in the top right corner of the screen | None |
| AST | <Del><Alt><Esc> | None |
| Phoenix | <Del><Alt><S> | None |
| Hewlett Rackard(HP) | <F2> | None |


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## Table #5 – Frequently asked questions

| Error | Description | Suggested solution |
|---|---|---|
| Memory bank | Memory bank is bad | Replace it and try again |
| | Some pins are oxidized or dirty | Clean the pins and try again |
| | It does not match the other bank | Insert the right memory bank |
| | Plugged in the wrong direction | Insert it properly |
| Memory slot | The slot is dirty or there is something in it | Clean the slot |
| CPU | CPU is bad | Replace it (be sure it is not too hot before touching it) |
| | The jumper setup or CMOS setup of CPU is wrong | Check the setup of working voltage and frequency of CPU |
| | CPU pins are dirty | Clean the pins and try again |
| | CPU is not plugged well | Re-insert the CPU properly |
| Failure of CHM-02 | Some pins are dirty | Clean the pins and try again |
| | The card is plugged into the wrong slot | Plug again into correct slot |
| | The card is plugged in the wrong direction | Check the card direction and try again |
| | CHM-02 card is bad | Replace the card and try again |
| CHM-02 displays an error code | Motherboard error | See the description of error codes (Table #2 above), take an appropriate action and then try again |
| | The motherboard shows some error code on the display | Check the error message on the screen, take an appropriate action and then try again |


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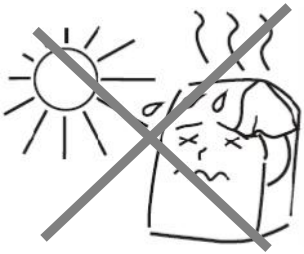


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Модель _____

Серийный номер _____

Срок гарантии _____

Дата продажи «____» _____ 20____ года

Фирма-продавец: _____
Адрес и телефон фирмы-продавца:
_____
М.П. С условиями гарантии ознакомлен и согласен:

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Підпис покупця: _____

ГАРАНТІЙНИЙ ТАЛОН № _____

Товар/модель _____

Серійний номер _____

Термін гарантії _____

Дата продажу _____

Продавець (назва, телефон)

_____

Печатка та підпис продавця

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